Course Title: Compilers and Languages **Sheet #6 2015/2016**

1. Consider the following grammar:

S ⟶ bAb | bBa
A ⟶ aS | CB
B ⟶ b | BC
C ⟶ c | cC

a) Give two reasons why this grammar is not LL(1).
b) Rewrite the grammar, introducing as few new non-terminals as possible, so that it is LL(1) and recognizes the same strings as the original grammar.
c) Construct the first and follow sets for each non-terminal in the rewritten grammar.
d) Construct an LL(1) parse table for the rewritten grammar.

2. LL Parsing

Consider the following grammar over the alphabet Σ = {u, v, w, x, y, z}:

```
S -> UVW
U -> u | Wv | ϵ
V -> w | xU | ϵ
W -> y | z
```

(a) Give the first sets of the non-terminals and the follow sets of the terminals and non-terminals.
(b) Give the parsing table for this grammar.
(c) Is this grammar LL(1)? Explain.

3. construct an LL(1) parsing table for the following grammar:

$$
\begin{aligned}
S &\rightarrow Sab \mid c \mid dT \mid eS \mid SaT \\
T &\rightarrow d \mid UV \\
U &\rightarrow ab \mid \varepsilon \\
V &\rightarrow dVb
\end{aligned}
$$

Best wishes

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